

EFFICIENCY OF PUBLIC PROCUREMENT IN THE CZECH AND SLOVAK HEALTH CARE SECTORS

Juraj NEMEC
Matúš KUBÁK
Gleb DONIN
Zuzana KOTHEROVÁ

Abstract

Health systems in most (if not all) countries perpetually struggle with financial problems and search for resources to cover health care needs. Increased efficiency of health procurement has the potential to save a lot of money and to reallocate them to treatments. The aim of our study is to analyze technical efficiency (efficiency/economy dimension) and allocation efficiency (effectiveness) of public procurement in health care facilities in the Czech Republic and Slovakia, countries whose health systems are governed by the principle of universal access to high quality health services. Concerning the technical efficiency, the results show a low rate of competitiveness whereby the potential of competition is not exploited. In terms of allocation efficiency, our research also sufficiently illustrates the criticality of the situation; however, compared to the element of technical efficiency the situation in the evaluated countries is different. In Slovakia, purchases are usually decided by doctors and procurement is prepared without the necessary ex-ante analysis. In the Czech Republic, the ex-ante evaluation of purchasing of medical equipment is regulated, however, the decision-making process is non-transparent and does not guarantee allocative efficiency. The study has critical policy implications – both countries should urgently adopt measures to improve their respective procurement processes.

Keywords: health care, public procurement, allocation efficiency, technical efficiency, Czech Republic, Slovakia.

Juraj NEMEC

Professor, Department of Public Economics,
Faculty of Economics and Administration,
Masaryk University, Brno, Czech Republic
Professor, Department of Finance
and Accounting, Faculty of Economics,
Matej Bel University, Banská Bystrica, Slovakia
E-mail: juraj.nemec@umb.sk
Tel.: 0042-1-905-164.820

Matúš KUBÁK

Senior lecturer, Department of Regional Sciences
and Management, Faculty of Economics,
Technical University in Košice, Košice, Slovakia
E-mail: matus.kubak@tuke.sk

Gleb DONIN

Senior lecturer, Department of Biomedical Technology,
Faculty of Biomedical Engineering,
Czech Technical University, Kladno, Czech Republic
E-mail: gleb.donin@fbmi.cvut.cz

Zuzana KOTHEROVÁ

Senior lecturer, Department of Public and Social Policy,
Faculty of Social Sciences,
Charles University, Prague, Czech Republic
E-mail: zuzana.kotherova@fsv.cuni.cz

1. Introduction

Increasing the efficiency of public procurement, through which both Slovakia and the Czech Republic spend about 15% of their GDP, is one of the key factors in the functioning of the public finance system. According to the experts and the general public, public procurement has many weaknesses in both countries, with the result that public procurement (PP) also does not function efficiently in the health care sector. The core problems in the Czech and Slovak public procurement systems are well described by existing studies. For example, Grega (2018) identified and analyzed the main factors determining the efficiency of public procurement (PP) in Slovakia through extensive primary and secondary research. His questionnaire survey among contracting authorities and suppliers in PP in Slovakia shows that excessive bureaucracy in PP in Slovakia is perceived as the most important factor determining its efficiency. According to the contracting authorities, the second most important factor was the 'frequent change of legislation' whilst 'insufficient ethics and morality on the part of contracting authorities and/or procuring authorities' was ranked third by the respondents. Corruption is the fourth most important factor from the point of view of contracting authorities whilst the lack of competitiveness (few suppliers involved in PP) was the fifth most important factor determining the efficiency of PP in Slovakia from the point of view of contracting authorities. From the suppliers' point of view, the most important factor is 'lack of ethics and morality on the part of contracting authorities and/or procuring authorities' and the suppliers placed the 'excessive bureaucracy' factor in the second place. Close behind the first two factors, the third most important factor determining the effectiveness of PP in Slovakia, from the suppliers' point of view, is corruption. In the remaining places, the factors were placed in this order: 'lack of control', 'non-compliance on the part of the contracting authorities', and 'few suppliers involved in PP'.

The aim of our study is to analyze technical efficiency (efficiency/economy dimension) and allocation efficiency (effectiveness) of public procurement in health care facilities in the Czech Republic and Slovakia. Over the past few years, the health systems in both countries have perpetually struggled with financial problems, and have a total spending of around 6 to 7% of GDP. In such a situation, any leak of resources via inefficient procurement endangers the principle of universal access to high quality health services, which is the official 'motto' of both systems.

Previous existing studies (and well-known scandals, such as the procurement of CT tomography equipment in Slovakia) confirm important problems with public procurement in Czech and Slovak health care establishments. For example, an earlier benchmarking study by Vlach, Sicakova-Beblava and Nemeč (2004) demonstrated fundamental inefficiencies in the process of purchasing goods by Slovak hospitals. At that time, the director of a hospital with one of the least quality purchasing records replied in an interview on Slovak Television that the role of hospitals is not to procure efficiently but to treat patients. The obvious question arises: is the situation

improving, or wasting of resources is still a pertaining problem of the investigated health systems?

2. Efficiency of public procurement

Efficiency was defined by Samuelson and Nordhaus (1992) as a condition where there is no wastage. When evaluating the efficiency of public procurement (hereinafter referred to as PP) it is possible to focus on a number of dimensions and available evaluation methods (Ochrana, 2004). In view of this state, we consider it necessary to distinguish between allocation and technical efficiency. Allocation efficiency is defined by e.g. Stiglitz (2000) as an optimal allocation of scarce resources in the economy. Allocation efficiency mainly deals with whether the utilization of resources will achieve the desired state. Technical efficiency is defined by Kerstens (1999) as production within the constraints of production possibilities, so scarce resources are utilized to the maximum extent possible. Monitoring allocation and technical efficiency in practice is often done by monitoring the so-called ‘3E’, i.e. economy, efficiency, effectiveness (see Table 1).

Table 1: Essence of the principles of 3E

Principle	What it monitors
Economy (technical efficiency)	Minimizing costs
Efficiency (technical efficiency)	Total cost per unit of output (ratio)
Effectiveness (allocation efficiency)	Success rate in achieving goals (do we do the right things; do we achieve the effects?)

Source: Author’s own construction according to Ochrana (2004)

A suitable specific tool for assessing the economy and, to some extent, the effectiveness of PP is benchmarking, which can be used for internal comparisons (compare prices of the same goods, services and construction works within the organization) or external ones (compare with market prices or with other contracting authorities), and it ultimately increases the efficiency of PP (Chamberland, 2005).

From the legal point of view, the current PP legislation in the Czech Republic (Act no. 134/2016) and in Slovakia (Act no. 343/2015) focuses only on technical efficiency and not allocation efficiency. For example, Para. 10(2) of the Slovak Public Procurement Act no. 343/2015 states that ‘the public procuring authority and the procuring authority must respect the principles of equal treatment, non-discrimination of economic entities, transparency, proportionality and economy and efficiency’. The concept of 3E (‘value for money’) is only indirectly connected to PP, but it has started to receive more and more attention in both countries – for example, Slovakia created a specialized Value for Money Unit at the Ministry of Finance of the Slovak Republic.

3. Research about factors determining allocative and technical efficiency of health care procurement

There exists a large number of papers dealing with acquisition of goods, services and works, many of them with a focus on health care sector procurement. The comprehensive paper of Decarolis and Giorgiantonio (2015), mapping health procurement procedures in Europe, uses data covering the universe of EU public tenders for the period 2009-2014. The authors describe the key empirical features of the market with regard to awarding procedures and contractual forms and discuss the implications for quality, competitiveness, corruption and product innovation. Kumar, Ozdamar and Ng (2005) review the existing literature in procurement performance measurement and, on this basis, they identify the key areas of purchasing performance. The authors also develop a model and a balanced scorecard by establishing a set of generic measures. Arney *et al.* (2014) researched the use of strategic contracting practices in public procurement. According to their opinion, it may present an opportunity for substantial improvements in procurement efficiency and commodity availability.

The first core element of this paper, related to economy/efficiency, is competitiveness. According to the findings reported in scientific literature, a low rate of competitiveness has direct impact on the final price, which is most often assessed by comparing the estimated value of the contract with the tender price. Gupta (2002) found that 6-8 offers are needed to achieve the highest savings. The findings of Brannman, Klein and Weiss (1987) are very similar – the highest savings were achieved with 7 to 8 bidders for most control groups. Gineitienė and Šerpytis (2011) analyzed procurement of technically identical and standardized goods. The results were similar to those of the previous authors where significant savings were achieved (for some goods even higher than 10% or 20%) with an incrementation from one tenderer to two.

The research on the impacts of competitiveness on the procurement results is relatively frequent in the conditions of the Czech and Slovak Republics. Soudek and Skuhrovec (2013) analyzed the procurement of electricity and natural gas (homogeneous products) in the Czech Republic. The authors pointed out several important findings in their work. According to them, contracting authorities regularly overestimate the forecasted value of the contract, ergo, their price forecast does not correspond to the current market price, and the greatest impact on the final price is due to the chosen procurement method (the utilization of the open tender decremented the achieved price, on average, by 7%) and, on average, each supplemental tenderer decremented the final price by 1%. Pavel (2010) analyzed the impact of competitiveness on the price of road constructions and railway transport infrastructure in the Czech Republic. In his work, he found that, on average, each additional tenderer reduced the resulting price by 3.27%. In Slovakia, a frequently cited work is by Šípoš and Klátik (2013). The authors focused not only on competitiveness, but also on the impact of utilizing e-auctions and of the procedures used, and found that as the number of tenderers incremented, the resulting price of tenders declined and the highest savings were

achieved with five or more tenderers. Sičáková-Beblavá, Klátik and Beblavý (2013) found that the first bid reduces the price by an average of 4%, and each subsequent bid reduces it by 84% of the precedent reduction. According to the authors, three bidders should be enough to achieve 10% savings and, according to the authors, savings of up to 20% can be achieved. Grega (2018) delivered a really comprehensive study analyzing the level of competitiveness in the Czech (2008-2013) and Slovak (2010-2014) procurement of goods, services and works. His calculations on the Slovak sample of 27,234 procurements between January 1, 2009 and August 12, 2014 shows that the calculated price decrease for a second tenderer was 7.7%, for a third tenderer 8.9%, for a fourth tenderer 11.75%, and the peak, 16.9%, was achieved in PP with five tenderers.

The second core element of this paper related to effectiveness is procurement planning, with a focus on the health technology assessment (HTA), which represents a critical success factor determining allocative efficiency of health care procurement. The importance of achieving allocative efficiency is connected with the fact that progress in the development of new drugs, medical devices, diagnostic and therapeutic interventions is leading to a constant expansion of treatment options. All of these areas are collectively referred to as 'medical technologies', and include drugs, medical appliances, medical devices, diagnostic and therapeutic methods, diagnostic tests, as well as preventive measures in healthcare. However, the supply of these new health technologies and the costs associated with it are growing significantly faster than the available financial resources in national health systems. Health systems thus find themselves in a situation where they cannot offer all these technologies to their citizens, but only have to choose some of them. It is therefore necessary to decide regularly whether new technology offers sufficient value for money (Henshall and Schuller 2013). For the needs of this complex decision-making process, a specific method of evaluation of health technologies, the so-called HTA – health technology assessment, is used.

The essence of the HTA approach is that it comprehensively analyses various aspects of the implementation of the evaluated technology. Emphasis is placed on demonstrating clinical efficacy and safety, as well as on the cost-effectiveness of the technology. The HTA also includes an analysis of ethical, legal, organizational and other aspects and impacts associated with the use of the relevant technology in healthcare. In most countries where HTA is in place, this method is mainly used in drug price negotiations and the inclusion of new medicines in the reimbursement system. The use of HTA for the evaluation of medical devices and treatment and diagnostic interventions is less widespread; however, it may bring the same positives as for drugs and medicines, i.e. efficiency of the use of public resources. In recent years, in developed countries, HTA has also been linked to procedures for securing purchases in health care.

The combination of HTA and PP means that the competition documents are linked to the results of HTA studies and clinical guidelines. In the field of medical technology and medical devices, the results of national and regional HTA studies can be used

in the preparation of public procurement (needs analysis, selection of appropriate technology or preparation of the necessary technical specification). An example is the HTA study on medical devices from the British HTA agency NICE (National Institute for Health and Care Excellence), the conclusions of which are used as recommendations for managers responsible for purchasing medical devices throughout England's health care system (Fuchs *et al.*, 2017).

As HTA is an evidence-based process that aims to examine the health, social, economic and ethical implications of using technology in healthcare delivery, HTA becomes a decision support tool when providing the necessary evidence of the costs and benefits of technology. Therefore, the benefit of using the principles of HTA can be stated in the fact that using HTA methods, the value of the purchased technology could be determined within the more advanced practices of public procurement (so-called 'value-based procurement'). Therefore, in recent years, increased attention has been paid to the integration of a comprehensive approach to the evaluation of bids in public procurement to help the criterion of the most economically advantageous tender (MEAT). Specifically, some factors used in the HTA analysis are reflected in public procurement, where they form the evaluation criteria of individual bids. In addition to the costs themselves, the evaluation criteria often include, for example, the shelf life of the medicines or ensuring safety when administering medicines (e.g. container designed to reduce the risk of medication errors).

Recently, the principles of HTA have also been used in the implementation of PP directly at the hospital level (Zavadil *et al.*, 2016). The use of hospital based HTA (HB-HTA) for the selection of medical technology at the hospital level allows including the specific requirements and environment of the buyer, which is usually missing in large, or national, HTA studies. The HB-HTA therefore takes into account factors relevant to the specific institution, e.g. organizational structure, method of ensuring technology management, strategic goals and plans, characteristics of the catchment area, etc. The specific implementation of the HB-HTA principles depends on the internal requirements and capabilities of the care provider. In terms of the purchasing process, the role of HB-HTA is to provide the hospital management with the necessary information for better targeting and organization of the public contract. An example is the grouping of Swedish municipalities that commissioned a HTA study on a new antibacterial medical device prior to awarding a public tender, as there were doubts in terms of its clinical and cost-effectiveness (Askfors and Fornstedt, 2018).

4. Research methodology

The aim of our article is to test selected factors determining the allocation and technical efficiency of health care procurement in the Czech Republic and Slovakia, namely the level of competitiveness and the scale of use of HTA in preparing tenders.

Both Czech and Slovak health sectors represent a public-private mix of providers: out-patient care is mainly privatized; the hospital sector in the Czech Republic is dominantly public, whereas in Slovakia university hospitals are public, whilst the

rest of the sector is constituted especially by non-profit private hospitals. Most of the finance comes from public health insurance schemes, delivering compulsory health insurance via the system of a pluralistic network of health insurance companies (the German model). Patients are entitled to a comprehensive scale of health services, covered by their health insurance, co-payments are very limited in Czechia and moderate in Slovakia (for more information, see, for example, Bjorkman and Nemeč, 2013).

As regards to methodology, from a technical efficiency point of view (in accordance with the existing knowledge about factors determining technical efficiency), we concentrate on the problem of competitiveness which determines economy/efficiency. From the point of view of allocation efficiency (effectiveness), we investigate to what extent an ex-ante analysis of the need of procured medical equipment (particularly HTA) is carried out. To achieve this goal, we set out the following two main and four auxiliary research questions:

1. What is the rate of competitiveness in PP in the Czech and Slovak health care sectors and what is its impact on economy/efficiency?
 - a) Rate of competitiveness?
 - b) Impact of the rate of competitiveness on the final price?
 - c) Indicative value of the indicator difference between expected and final price?
2. Does the allocation efficiency dimension also apply when preparing tenders?
 - a) Is HTA and other methods of ex-ante evaluation of public expenditure used in the preparation of tenders?

From the point of view of measuring the rate of competitiveness we use dominantly quantitative research methods. To measure the economy/efficiency of PP we employ the most commonly used approach – comparing the estimated value of the contract with the winning bid's price. It is a transparent, unpretentious and quick way of evaluating, although its use is linked to certain issues that we will address when answering research question 1c. The PP methods are divided into competitive (public and restricted) and non-competitive (negotiated). The main source of data is our own primary quantitative research, covering a fully comprehensive and representative sample. When calculating the achieved savings, we processed a complete sample of all procurements in the Czech and Slovak health services for the period 2014-2019 (all registered PPs for the given period – almost 4,300 cases – are covered and their information was processed by us). To verify the issue of the fictitious estimated price (question 1c), we analyzed in detail the purchases of medical equipment by hospitals for 2017, based on documents available in the Public Procurement Office registers. Data on individual PPs were obtained from the national registers of the Public Procurement Office and processed by the authors of this article. The most important monitored variable is savings, we calculated them using the following formula:

$$Savings = \frac{Final\ price - Forecasted\ price}{Forecasted\ price}$$

We have omitted the extreme values (savings or overspendings over 60%) that could have been caused by transcription errors or major errors in estimating the forecasted PP price and cannot be caused by regular market competitiveness.

To study the impact of explanatory variables on the savings we run a generalized linear model with the following equation:

$$\text{Savings} = \beta_0 + \beta_1 \text{Procurement method}_i + \beta_2 \text{Year}_i \\ + \beta_3 \text{EU Quality criterion}_i + \beta_4 \text{Number of bids}_i + \varepsilon_i$$

where:

- Savings is the continuous variable obtaining values from interval [-60, 60];
- Procurement method is the binary variable indicating whether the public procurement process was performed via negotiation or tender;
- Year is the categorical variable indicating the date of the procurement;
- Quality criterion is the dichotomous variable which indicates whether the procurement contained also qualitative criterion; and
- Number of bids is the continuous variable which indicates the number of bids within the procurement process.

In terms of allocation efficiency, we will mainly use secondary qualitative analysis – analysis of PP documentation, available on the website of the Public Procurement Office and the information and materials of the Institute for Health Policy of the Ministry of Health of the Slovak Republic. To enrich the list of sources, we also interviewed a small sample of health sector specialists in both countries, experts directly involved with public procurement in the sector.

5. Discussion of results

5.1. Rate of competitiveness and its impact on the final price

As mentioned in the methodology part, in the following analysis we focus on three elements – level of competitiveness, impact of competitiveness on the final price, and the problem of fictitious savings.

Concerning competitiveness, as in other areas of the public sectors in the Czech Republic and Slovakia, the procurement process in health care has a very low competitiveness factor. According to the data obtained from our sample, the average number of bids varied between two and three for the whole monitored period (Figure 1).

PP in the Czech and Slovak health care sectors is characterized by a high proportion of competitions with one bidder – Figure 2. For example, up to 36.5% of PP in Slovakia in the period 2014 to 2019 were attended by only one bidder, i.e. approximately one third of PP in the monitored period was awarded without real competition among bidders. In the field of procurement of medical technology, this figure is up to 69.1%.

When calculating efficiency – the savings rate (the difference between the estimated and final price), we excluded all extreme values from the analysis (the extreme could be due to inadequate valuation of the subject of the contract, obvious typing

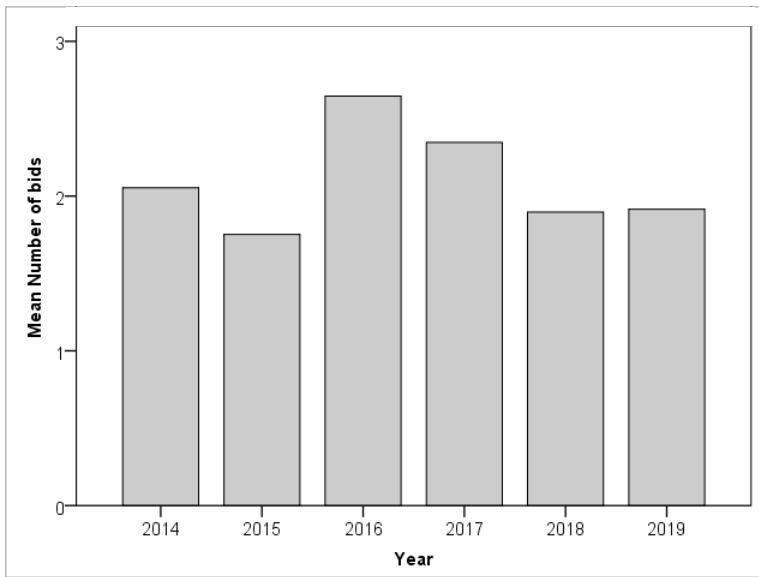


Figure 1: Competitiveness in PP in the Czech and Slovak health care sectors for the period 2014 to 2019

Source: Own processing based on data from the Public Procurement Office

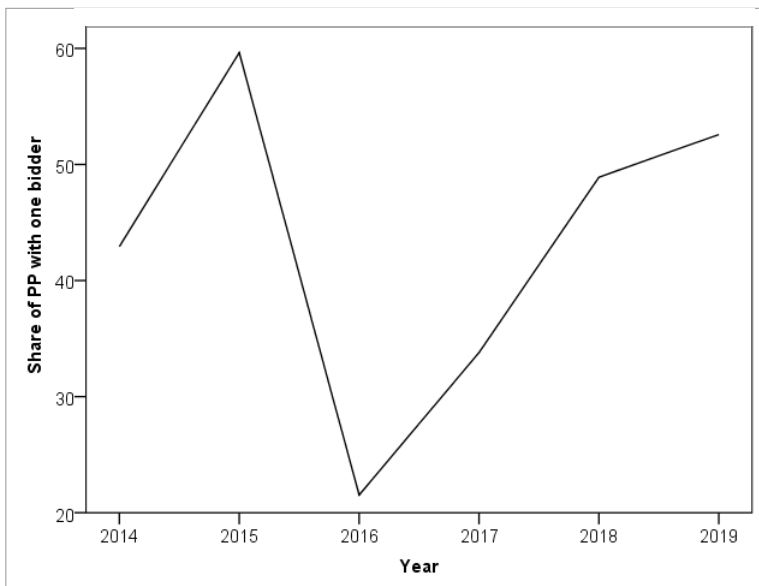


Figure 2: Share of PP with one bidder for individual years, Czech Republic and Slovakia, 2014-2019

Source: Own processing based on data from the Public Procurement Office

error, or improper setting of competition conditions). Figure 3 shows the results for the whole monitored sample.

Figure 4 characterizes the difference between the estimated and final prices and clearly shows the savings increase in proportion to the number of bids submitted. In the figure we used an interval of savings amount and modal number of bids for the given savings interval (we divided the savings into five equally sized bins: = savings less than or equal to zero ($\leq .0000$), savings of 0.01-0.25%, savings of 0.26-3.74%, savings of 3.75-14.47%, and savings greater than 14.48%).

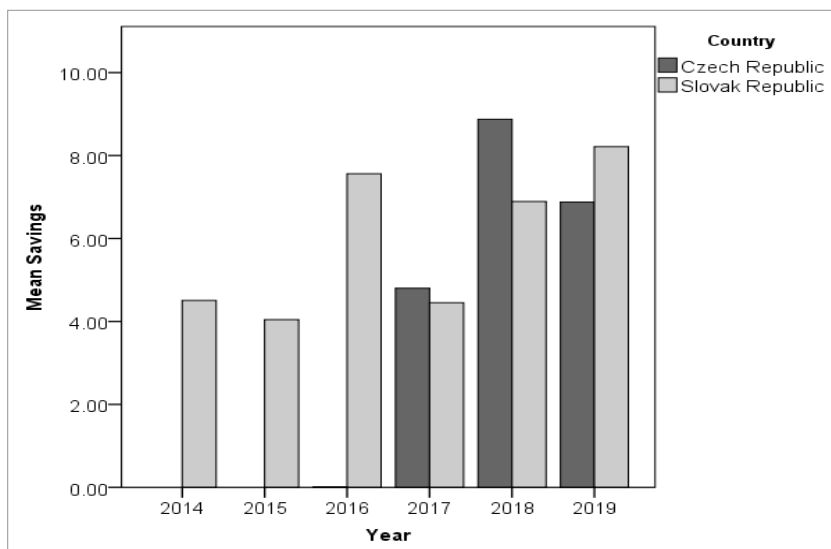


Figure 3: Average difference between estimated and final price 2014-2019 (savings in % of estimated price)

Source: Own processing based on data from the Public Procurement Office

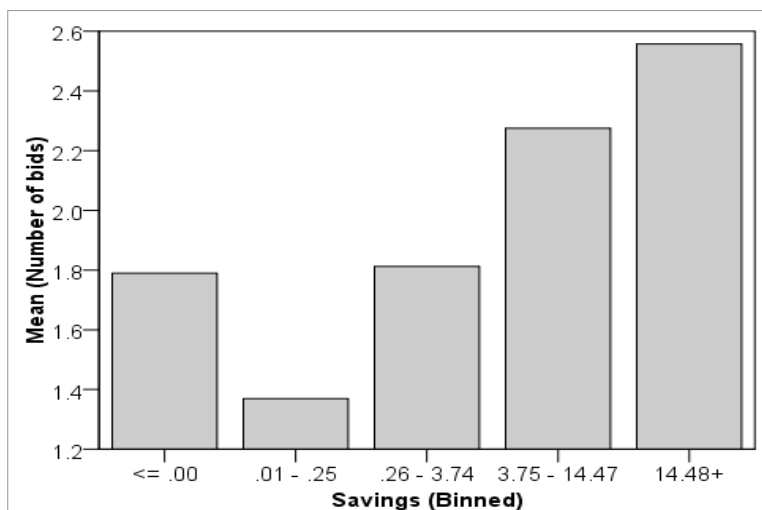


Figure 4: The relationship of competitiveness and savings in PP, Czech Republic and Slovakia, 2014-2019

Source: Own processing based on data from the Public Procurement Office

An interesting specific finding is the fact that, when purchasing is undertaken in the Slovak and Czech health care sectors, the possibility of using the most economically advantageous offer as a selection criterion is not used – the only criterion used is the lowest price. This award criterion may be satisfactory for standardized (homogeneous) procurement items, but it certainly is not when buying complex equipment, services or works.

The presented results are an exact mathematical picture of the data processing of the selected sample; however, as a matter of fact they do not have to be a suitable picture of the reality. The main problem that potentially limits the credibility of the findings is fictitious savings – setting the higher estimated value of the contract is beneficial for the contracting authority because it can achieve higher (albeit fictitious) savings.

According to some authors, the winning bid price should be compared to the market price (Soudek and Skuhrovec, 2013) and not the estimated price. The use of a market price as a benchmark is suitable for homogeneous goods and services with precise quality specifications and sufficient number of suppliers.

In our case, we tested the problem of fictitious savings on detailed data on medical equipment purchases for 2017. In the Public Procurement Office system, we set up the search term ‘nemocnica’ (hospital) and CPV code ‘Zdravotnícke vybavenie’ (medical equipment) through the search mechanism. To our surprise, for the year in question, we identified only eleven completed competitions in the system and in three cases the savings were extremely high. For a detailed examination, we first chose the purchase of operating tables – an estimated price of 80,000 EUR and a final price of 41,785 EUR, or 47.8% savings. From the text of the signed contracts, we discovered which specific model of the table the hospital had bought, which allowed an approximate price benchmark. Examination of similar purchases shows that the final price oscillates around current market prices for purchased table models (perhaps with a little overpricing, but this cannot be accurately assessed), which clearly implies that the estimated price has been inflated. For the purposes of this research, we do not consider it necessary to investigate how the miscalculation of the price occurred (whether by poor specification and purchasing a cheap alternative that the hospital might not want or whether it was done deliberately), what is important is that we have been able to document the real existence of the concept of ‘fictitious savings’ on a concrete example.

Regression results are in Table 1. A test of the significance of the model with the following hypotheses was run:

H0: The suggested model is not significantly suitable for the data.

H1: The suggested model is significantly suitable for the data.

The Likelihood Ratio Chi-Square is 258.5 on 8 degrees of freedom, with p value <.001, so we can reject the null hypothesis and we can assume that model is well suited.

Table 1: Regression

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test			95% Wald Confidence Interval for Exp(B)		
			Lower	Upper	Wald Chi-Square	df	Sig.	Exp(B)	Lower	Upper
(Intercept)	4.291	1.0546	2.224	6.358	16.557	1	.000	73.048	9.246	577.135
[Procurement method= Negotiation]	1.838	1.0049	-.132	3.807	3.344	1	.067	6.282	.877	45.030
[Procurement method= Tender]	0 ^a	.	.	.	.	.	.	1	.	.
[Year=2014]	-3.167	.7940	-4.723	-1.611	15.910	1	.000	.042	.009	.200
[Year=2015]	-2.814	.8650	-4.510	-1.119	10.586	1	.001	.060	.011	.327
[Year=2016]	-1.288	.8182	-2.892	.315	2.479	1	.115	.276	.055	1.371
[Year=2017]	-3.653	1.0251	-5.663	-1.644	12.702	1	.000	.026	.003	.193
[Year=2018]	.474	.7376	-.971	1.920	.414	1	.520	1.607	.379	6.821
[Year=2019]	0 ^a	.	.	.	.	.	.	1	.	.
[Quality criterion=Price]	-2.163	1.0294	-4.180	-.145	4.414	1	.036	.115	.015	.865
[Quality criterion=MEAT]	0 ^a	.	.	.	.	.	.	1	.	.
Number of bids	2.513	.1675	2.185	2.841	225.169	1	.000	12.341	8.888	17.136
(Scale)	207.438 ^b	4.4968	198.809	216.441						

Dependent Variable: Savings

Model: (Intercept), Procurement method, Year, Quality criterion, Number of bids

a. Set to zero because this parameter is redundant.

b. Maximum likelihood estimate.

The interpretation of the obtained coefficients delivers interesting findings. The most important variable appears to be the number of bids. In the case of number of bids, we conclude that an increase in the number of bids by one induces an increase in savings by more than 12%.

The results for other variables are interesting and not fully in line with general expectations. When negotiation is used as a procurement method, savings are 6.3% higher than in the case of open tender. When we take into consideration the year in which the public procurement took place and set 2019 as a reference year, we notice that even if the time of the procurement is statistically significant, its impact on the creation of savings is minimal. If we compare public procurement procedures where the final price is used as the award criterion against procedures where the MEAT criterion is used, we observe that savings are subtly higher in the case of procurement where the award criterion is the lowest price.

5.2. Objectification of the need for the subject of the procurement: HTA

As already mentioned, both Czech and Slovak Public Procurement Acts do not directly include the need to monitor the allocation efficiency – the effectiveness of planned expenditures – when purchasing from public sources. However, this requirement arises implicitly, for example in Slovakia in relation to the wording of the Act on Financial Control and Audit (Act no. 357/2015), which stipulates in paragraph 5 that ‘The public administration body is obliged to create, maintain and develop financial management within which it ensures economical, efficient, effective and meaningful execution of the financial operation or part thereof’.

5.2.1. Ex-ante evaluations of effectiveness of planned procurement – the Czech Republic

The Czech Act (Act no. 134/2016, The Public Procurement Act) regulates the course of public procurement itself and does not interfere in the area of needs analysis prior to the contract itself. However, in the activities of individual Czech stakeholders in the health sector (especially the Ministry of Health) certain elements can be stated (especially a comprehensive view of the cost and organizational impact of introducing technology into hospital operation) using the above-mentioned principles/methods of HTA.

In the last decade, many purchases of medical equipment in the Slovak Republic have raised and still raise doubts about the suitability, effectiveness and price of purchased devices (Rogalewicz, 2015). In response to this situation, a commission was set up in 2014 at the Ministry of Health to assess new device technologies and capacities covered by health insurance, the so-called Instrument Commission. During the existence of the commission, there were several changes in the methodology of its work, but the purpose remained the same – assessment of proposals for the location and operation of instrumentation, which is covered by public health insurance through

services provided on them, or the purchase of devices with subsidies from the state budget. As part of its activities, the commission assesses the devices primarily in terms of the effectiveness of their procurement in relation to the need for availability of these devices in the Czech Republic, taking into account their effective utilization. The assessed medical devices include e.g. CT, MRI, radiotherapy technique, robotic surgical systems and other techniques more expensive than 5 mil. CZK excl. VAT, i.e. all ‘big’ medical devices. Before issuing a public contract, the applicant (healthcare provider) must submit an application to the commission according to the set content, including a feasibility study. In the case of a completely new type of device, the commission uses the principles of HTA, i.e. in addition to the expected costs of operating the new technology, the medical benefit for the patient and for the health status of the population of the Czech Republic is also assessed.

The original work of the commission was assessed by experts as opaque, only the final opinions were published (supported, rejected or postponed). Since 2018, therefore, the submitted applications have been publicly available on the Ministry’s website, but without a feasibility study. Even in a situation where applications are available to the public, the decision of the commission cannot be considered completely transparent, because the information in the application is very brief and the justification of the commission’s opinions is insufficiently detailed (approximately half a page). The commission meets four times a year and, in 2019, the commission assessed 35 applications for the purchase of new devices (existing and completely new types) and 108 applications for renewal (purchase of an existing device of the same type). Despite these reservations, given the complexity of the issue of deploying ‘old’ and making ‘new’ technologies, the very existence of such a body can be considered beneficial, as it is an effort to rationalize and guide the efficiency of public funds spent.

The situation was summarized by the interviewed Czech health care experts as follows:

‘Concerning manufactured devices costing over 5 mil. CZK excl. VAT, every purchase in the Czech Republic – if the operator wants to operate it in the regime of payments from public health insurance companies or if it is purchased from public money – must pass the Commission for assessment of new instrument technologies and capacities paid from health insurance (so-called ‘Instrument Commission’). HTA studies (regular, not HB-HTA) are required in the Czech Republic only in the case of the first purchase of a certain technology (i.e. not renewal or expansion of existing capacities). HTAs which are already published elsewhere in the world or in the Czech Republic, are not required to create a new study, even if none exists. However, the decision of the Instrument Commission is purely political and is not required to take into account the results of HTA. In my opinion, the general knowledge of HTA methods in the Czech Republic is already relatively good, but hospitals are not sufficiently acquainted with the possibilities of using HTA elements at the level of medical facilities or their consortia (HB-HTA).’

5.2.2. Ex-ante evaluations of effectiveness of planned procurement – Slovakia

The analysis of allocative efficiency in health procurement in Slovakia is slightly more complicated. Non-profit and private hospitals (about 80% of regional hospitals have the character of a company or non-profit organization), are non-regulated in relation to the planning of purchasing and have full discretion in deciding what to purchase. To obtain a concrete picture, we interviewed a representative of the Public Procurement Department of a ‘district’ hospital which has the legal character of a non-profit organization providing generally beneficial public services (Act no. 213/1997). The answer clearly demonstrates that the preparation of the tender specifications does not rely on any objective methods confirming the need and effectiveness of the purchase (allocation efficiency).

‘The purchase of medical equipment and the related planning are coordinated by the operational and technical department in close cooperation with the heads of departments. Planning is linked to the financial capabilities of the hospital, so we cannot talk about planning ‘in the true sense of the word’, i.e. priority is to be given to the purchase of equipment that is morally and physically worn out yet necessary for the provision of health care. The planned purchase of medical equipment in the period 2019-2020 is worth approximately 2 mil. EUR. Neither HTA or financial and economic ex-ante analysis – simply put, a feasibility study is not made before the purchasing decision. It is mainly the doctors and head physicians of the individual departments who decide (based on the requirements of their doctors).’

From the perspective of public hospitals, according to our findings, the situation was similar prior to 2017 and resulted in the purchasing of overpriced and unnecessary devices (several scandals are documented by the media). Since 2017, the Institute of Health Policy (Inštitút zdravotnej politiky – IZP) has been directly involved in the processes of purchasing medical equipment by public hospitals, and analyses each preliminary requirement sent to them by organizations. For each purchase of medical equipment, IZP prepares a standpoint on the estimated price and monitors the outcome of the procurement. This has so far been conducted only in Excel in the following structure of monitored data – serial number, date of receipt of the application, applicant, contact person, contact, required group of medical equipment, required group of health equipment, date of issue of standpoint, type of standpoint, person responsible for sending standpoint, link for expressing views, date of application to Department of Public Procurement (Odbor verejného obstarávania – OVO), date of application from OVO to IZP, date when application for PP has been processed, requested price excl. VAT (EUR) from market research, approved maximum amount excl. VAT (EUR), commencement of PP, conclusion of PP, entry price excl. VAT (for e-auctions), competition participants and their price, winning participant, winning bid price excl. VAT (EUR), link to procurement/contract, procured medical equipment, and savings.

A shortcoming that should be removed in the future is that IZP will focus mainly on price benchmarking when approving medical equipment purchases, and will only marginally assess the need (in exceptional cases, IZP could refuse unnecessary equipment with parameters that do not meet the needs of the relevant hospital, but this is not yet systemically happening).

6. Conclusions

The aim of our study was to verify the efficiency of public procurement in the Czech and Slovak health care sectors, focusing on both technical and allocation efficiency. Concerning the technical efficiency, the results are not at all encouraging in that they show a low rate of competitiveness thereby not exploiting the potential of competitors to achieve economy/efficiency (this potential was fully confirmed by our regression model). The reported savings, calculated as the difference between the planned and final price, averaged around 6%, which is low and fully corresponds to the small number of bids submitted and evaluated. Moreover, a more detailed analysis suggests that the reported savings are only fictitious (due to the overestimation of the planned price) and according to our data, the health care sectors conduct unnecessarily expensive purchases, probably above the current market price level (exact benchmark of purchase and market prices is not retroactively possible). Excessive use of the lowest price criterion in the award of contracts only exacerbates the situation. The regression model shows some very interesting findings, which are not fully supported by other research in the area – for example, the fact that the negotiation method delivers better prices compared to open tender. We do not have an explanation for this at this stage of our research.

In terms of allocation efficiency, more detailed publicly available data are lacking, especially for Slovakia, but our research sufficiently illustrates the criticality of the situation. Compared to the element of technical efficiency, the situation in the evaluated countries is significantly different. In Slovakia, purchases are usually decided by doctors and procurement is prepared without the necessary ex-ante analysis of the effectiveness of the planned purchase. The activities of the Institute of Health Policy, which regulates purchases of medical equipment in public hospitals, have improved the situation in the recent past, but not to the required extent. In the Czech Republic, the ex-ante evaluation of purchasing of medical equipment is regulated and the official body – commission – responsible for approving such purchase has been established. However, the decision making of this commission is non-transparent and does not guarantee allocative efficiency. According to the opinion of the authors, the core explanatory factor of this situation is the existence of systemic corruption in both countries (Langr, 2020), which determines the processes and results of public procurement (not only in hospitals).

The results of this study deliver significant policy lessons and suggest critical policy recommendations. On the one hand, health establishments in both countries

complain that they do not have enough resources to cover costs of universally provided high quality care for patients in need. On the other hand, they waste significant amounts of resources because of inefficient and ineffective public procurement.

From the point of view of technical efficiency, existing studies (Grega, 2018; Langr, 2020) indicated that a limited number of bids is not the result of low supply capacity of the market. On the contrary, it is dominantly the results of existing systemic corruption and also a reflection of the low quality of the functioning of public procurement systems, overwhelmed by bureaucracy, but without any clear focus on efficiency. In such a situation, two lines should be followed. One of them is reforming how public procurement functions in the country – to refocus from an emphasis on the compliance with bureaucratic rules to an emphasis on results, which can be evaluated for example by systematic benchmarking (Nemec, Grega and Orviska, 2020). The second line is connected with general trends related to fighting corruption – both education (to limit the high level of tolerance to corruption) and punishment (to increase the risks connected to fraudulent behavior) seem to be critical elements.

From the point of view of allocation efficiency, the Czech example shows how to start – some level of centralization and central regulations is necessary. However, it is also necessary to achieve maximum transparency of such oversight.

Acknowledgment: The paper is processed as the output of the research project of the Slovak grant agency APVV, project APVV-17-0360 (Multidimensional analysis of significant determinants of public procurement efficiency with emphasis on the application of Health Technology Assessment in the process of procurement preparation).

References:

1. Act no. 134/2016 on Public Procurement, Collection of Laws of the Czech Republic, vol. 51/2016.
2. Act no. 213/1997 on Non-Profit Organisations Delivering Public Services, Collection of Laws of the Slovak Republic, vol. 95/1997.
3. Act no. 343/2015 on Public Procurement, Collection of Laws of the Slovak Republic, vol. 95/2015.
4. Act no. 357/2015 on Financial Control and Audit, Collection of Laws of the Slovak Republic, vol. 98/2015.
5. Arney, L., Yadav, P., Miller, R. and Wilkerson, T., 'Strategic Contracting Practices to Improve Procurement of Health Commodities', 2014, *Global Health: Science and Practice*, vol. 2, no. 3, pp. 295-306.
6. Askfors, Y. and Fornstedt, H., 'The Clash of Managerial and Professional Logics in Public Procurement: Implications for Innovation in the Health-care Sector', 2018, *Scandinavian Journal of Management*, vol. 34, no. 1, pp. 78-90.
7. Bjorkman, W.J. and Nemec, J. (eds.), *Health Reforms in Central and Eastern Europe: Options, Obstacles, Limited Outcomes*, Hague: Eleven, 2013.

8. Brannman, L., Klein, D. and Weiss, L., 'The Price Effects of Increased Competition in Auction Markets', 1987, *The Review of Economics and Statistics*, vol. 69, no. 1, pp. 24-32.
9. Chamberland, D., 'Boosting Your Best Practices', 2005, *Purchasing B2B*, vol. 47, no. 6, pp. 16-17.
10. Decarolis, F. and Giorgiantonio, C., 'Public Procurement of Healthcare in Europe: The Case of Medical Devices', 2015, *Rivista di Politica Economica*, vol. 104, no. 4/4, pp. 7-36.
11. Fuchs, S., Olberg, B., Panteli, D., Perleth, M. and Busse, R., 'HTA of Medical Devices: Challenges and Ideas for the Future from a European Perspective', 2017, *Health Policy*, vol. 121, no. 3, pp. 215-229.
12. Gineitienė, Z. and Šerpytis, K., 'The Impact of Competition and Purchase Volume on the Price in Public Procurement Tenders', 2011, *Socialinin Mokslu Studijos*, vol. 3, no. 2, pp. 473-485.
13. Grega, M., *Možnosti zvýšenia efektívnosti verejného obstarávania v SR* [Possibilities of Increasing the Efficiency of Public Procurement in the Slovak Republic], Matej Bel University, Banská Bystrica, Slovakia, 2018.
14. Gupta, S., 'Competition and Collusion in a Government Procurement Auction Market', 2002, *Atlantic Economic Journal*, vol. 30, no. 1, pp. 13-25.
15. Henshall, C. and Schuller, T., 'Health Technology Assessment, Value-based Decision Making, and Innovation', 2013, *International Journal of Technology Assessment in Health Care*, vol. 29, no. 4, pp. 353-359.
16. Kerstens, K., 'Decomposing Technical Efficiency and Effectiveness of French Urban Transport', 1999, *Annales d'Économie et de Statistique*, no. 54, pp. 129-155.
17. Kumar, A., Ozdamar, L. and Ng, C.P., 'Procurement Performance Measurement System in the Health Care Industry', 2005, *International Journal of Health Care Quality Assurance*, vol. 18, no. 2, pp. 152-166.
18. Langr, I., *Veřejné zadávání v prostředí systémové korupce* [Public Procurement in the Environment of Systemic Corruption], Prague: Universita Karlova, 2020.
19. Nemeč, J., Grega, M. and Orviska, M., 'Over-Bureaucratization in Public Procurement: Purposes and Results', 2020, *Public Sector Economics*, vol. 44, no. 2, pp. 251-263.
20. Ochrana, F., *Hodnocení veřejných projektů a zakázek* [Evaluation of Public Projects and Contracts], Prague: Ekopress, 2004.
21. Pavel, J., 'Analýza vlivu míry konkurence na cenu rozsáhlých staveb v dopravní infrastruktuře' [Analysis of the Influence of the Degree of Competition on the Price of Large-Scale Constructions in Transport Infrastructure], 2010, *Politická Ekonomie*, vol. 14, no. 3, pp. 343-356.
22. Rogalewicz, V., 'Health Technology Assessment (HTA): zdroj podpůrných informací pro strategické rozhodování' [Health Technology Assessment (HTA): A Source of Supporting Information for Strategic Decision Making], 2015, *Ekonomie ve Zdravotnictví*, vol. 1, no. 1, pp. 12-18.
23. Samuelson, P.A. and Nordhaus, W.B., *Ekonomía I* [Economics I], Bratislava: Bradlo, 1992.
24. Sičáková-Beblová, E., Klátik, P. and Beblavý, M., 'Ekonomické efekty elektronických aukcí na Slovensku' [Economic Effects of Electronic Auctions in Slovakia], 2013, *Ekonomický Časopis*, vol. 61, no. 10, pp. 1067-1078.

25. Šípoš, G. and Klátik, P., *Kvalita verejného obstarávania na Slovensku v roku 2012* [Quality of Public Procurement in Slovakia in 2012], Bratislava: TIS, 2013.
26. Soudek, J. and Skuhrovec, J., *Public Procurement of Homogeneous Goods: The Czech Republic Case Study*, Prague: Charles University, 2013.
27. Stiglitz, J.E., *Economics of the Public Sector*, New York: W.W. Norton & Company, 2000.
28. Vlach, J., Sicakova-Beblava, E. and Nemeč, J., *Monitoring verejného obstarávania vo vybraných nemocniciach SR* [Monitoring of Public Procurement in Selected Hospitals in the Slovak Republic], Bratislava: TIS, 2004.
29. Zavadil, M., Rogalewicz, V., Kubátová, I., Matloňová, V. and Salačová, K., 'Hodnocení zdravotnických technologií na úrovni nemocnice', 2016, *Časopis Lékařů Českých*, vol. 155, no. 5, pp. 254-259.